

Development of an Improvised Manual Airbrush Compressor for Students Artist in Nigeria

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Abstract

The study was set to develop and pilot a manual airbrush compressor for artists use in art and design. In the design of the manual airbrush, three established technological systems were adopted which includes, compressor, pressure tank and bicycle operating system. The idea was skillfully translated into a working drawing and developed into a prototype for testing. The piloted prototype result reveals that the manual air compressor could carry a successful operation with good result, the manual air compressor could inflate into a pressure tank air that could be used for airbrush designs. It was found to have more advantages than the automated, as follows: Cost less with very low maintenance rate, Cost of prime movers cut off, No usage of fuel, No air pollution and noise free. However, other users like tire menders, Car painters etc. could try the product.

Introduction

The research was motivated by challenges faced by student artists on the lack of basic equipment to enhance their creative skills and the ability to fuse into the modern best practices of art and design worldwide. This research is set out to improvise a manual airbrush compressor to aid students and other users of compressor as basic tool to enhance their productivities.

Improvisation, one of the mechanisms through which individuals and organizations accomplish routine breaking (Cunha, Cunha & Chia, 2007), is becoming increasingly hot in the organizational and strategic field. The recent attention paid by academic scholars to improvisation surges from the observation that in some artistic contexts, such as jazz and theatrical performances, innovation processes often successfully unfold through improvisation (Weick, 1998).

One of the reasons to approach a study on improvisation is the very promising explanatory potential of this concept, although the relatively youth of academic contributions implies a better conceptualization (the first empirical contributions are dated 1998). As a matter of fact, the fermenting research activity on improvisation led to some overlapping of contributions in different empirical settings, based on multiple theoretical frameworks. The result is a considerable confusion in defining what improvisation is, how it can be interpreted, and which are its antecedents and consequences.

Actually literature still offers multiple definitions of improvisation, even if it is quite possible to identify several common aspects that scholars usually relate to this concept. In this work improvisation is basically considered as “the deliberate and substantive fusion of the design and execution of a novel production”, following the definition given by Miner, Bassoff and Moornan (2001: 314). People can improvise for necessity, in spur of the moment, because of a lack of time for planning and designing. Nevertheless, individuals and organizations sometimes may also transform improvisation in an effective emergent strategy, or in a precise organizational state of mind, capturing improvisation capabilities in everyday organizational activities (Vera & Rodriguez-Lopez, 2007).

A central explanation to inquire improvisation resides in its role in management practices, even if improvisation per se does not determine effective results. Actually its impact on organizational practices depends on how it is managed and led, as it potentially creates both harmful and beneficial results (Vera & Crossan, 2004; 2005; Baker, Miner & Eesley, 2003).

Improvisation help on skills development and improve individuals skills, add value for organisations and for general improvement, it includes intended output of educational training effort and it should be an enable for growth.

What does Improvisation mean?

Improvisation, mean adopting a device for some use other than the standard ones, or it can be seen as a techniques or originating a total new instrument to give student opportunity to learn more, and can also be seen as making available substitutes in science and technology in case of emergency or lack in the process of teaching and learning, such tool or equipment must have been piloted or tested and found to be reliable.

The first challenge that arises studying improvisation is the tricky tentative to define what does improvisation mean and how it does unfold. A convincing explanation of this issue had be given through brief review of how and when this concept has been introduced in management literature, and after a clarification of the critical points related to this topic.

Specifically, improvisation is “the deliberate and substantive fusion of the design and execution of a

novel production”, following the definition given by Miner et al. (2001: 314).

Under this perspective, the degree of improvisation depends on the substantive (more than temporal) convergence between planning, designing and implementation activities. Actually, “the more improvisational an act, the narrower the time gap between composing and performing, designing and producing, or conceptualizing and implementing” (Moorman & Miner, 1998a: 702).

Improvisation helps in motivating students to engage in productive ventures such as preparing captivating skills in design to improve in all design concepts of world's best practice.

The study focus on ;

- (1) Development of manual airbrush compressor for students artists
- (2) Pilot test the developed manual airbrush compressor to see the output.
- (3) Determine and compare between the manual and the automated type of advantages in usage,

Methodology

The study adopted an approach considered under research and development as instrumentation resource development (Shabani & Okebukola 2001) In this approach, instructional resource curriculum materials such as improvisation skills and tools are developed and piloted. The approach is based on the system theory advocated by Dale (Heidi Milla Anderson. n. d.) A manual airbrush compressor was conceptualized, developed and tested. The air compressor is considered an important tool in design training for student artists. The development and testing of the manual airbrush compressor was aimed to supplement scarce instructional tools by improvisation. A design of the simple manual airbrush compressor for use by artists developed, the development of the equipment consist of three main systems

(1) Bicycle system of operation



(2) Compressor system



(3) Air storage tank.



- The parts adopted in the bicycle system includes
- Sprocket & pedal, hub and chain.
- A fly for starting torque

The parts of the machine and functions

1. Pedal use for turning the sprocket
2. Sprocket linking the chain to the hub
3. Chain linking the sprocket to the hub
4. Pulley linking the main pulley to the compressor
5. Pulley belt keep firm link between compressor pulleys

6. Fly wheel attached to the hub for starting torque
7. Hub linking the chain to the sprocket
8. Compressor
9. Network of square iron bars to keep firm the parts for effective operation
10. Bolt and nuts for fastening operatives' parts
11. Air Storage tank
12. Hose, valves joints, tires, shafts pressure meter gage & Handle.

STEPS IN THE DEVELOPMENT OF THE MANUAL AIRBRUSH COMPRESSOR

- (1) The design drawing of the manual air compressor
- (2) Materials sourced according to specification
- (3) The measurement and cutting of iron according to specification
- (4) Welding and fastening of the parts according to the design
- (5) Testing the performances of the prototype airbrush compressor
- (6) Painting of the airbrush prototype to preserve the body surface

PLAN AND ISOMETRIC RAWING OF THE MANUAL AIR COMPRESSOR

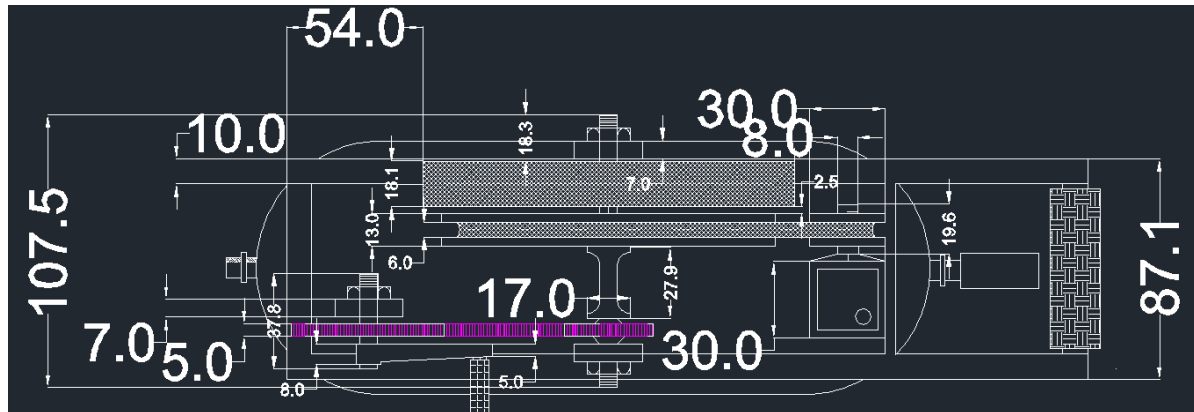


Fig. 1: Top view of Manual Compressor

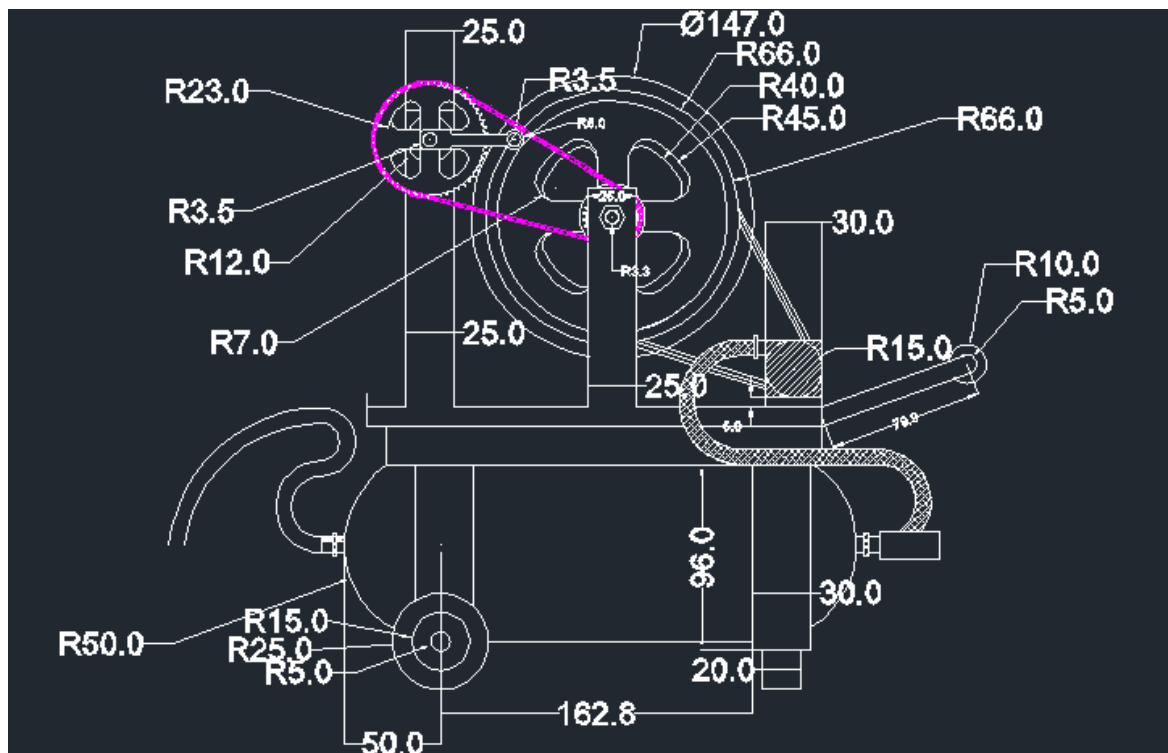


Fig. 2: Front view of Manual Compressor

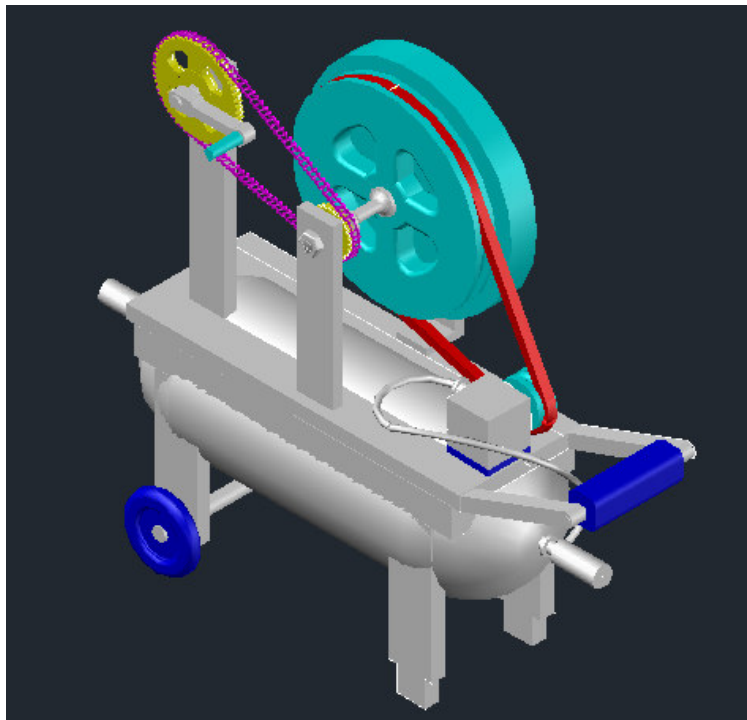


Fig 3: Isometric View of Manual Compressor **North East View**

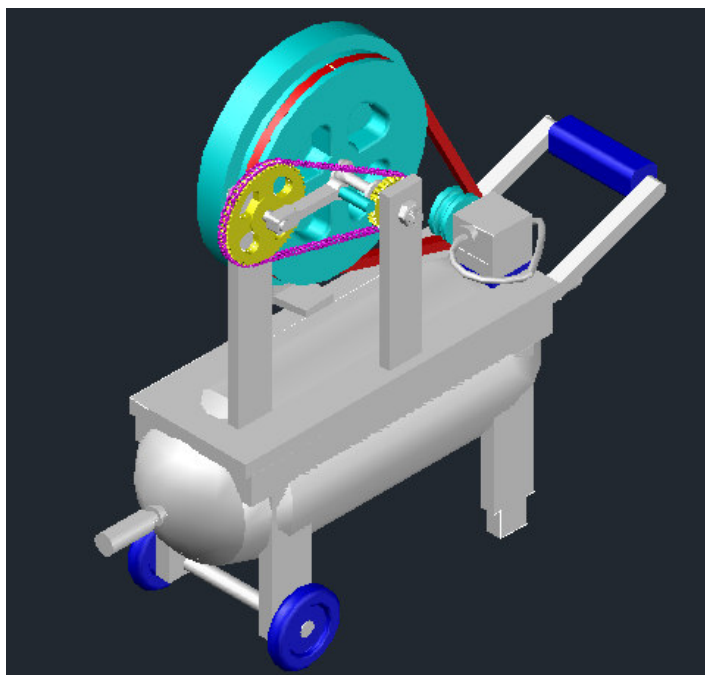


Fig 3: Isometric View of Manual Compressor **South West View**

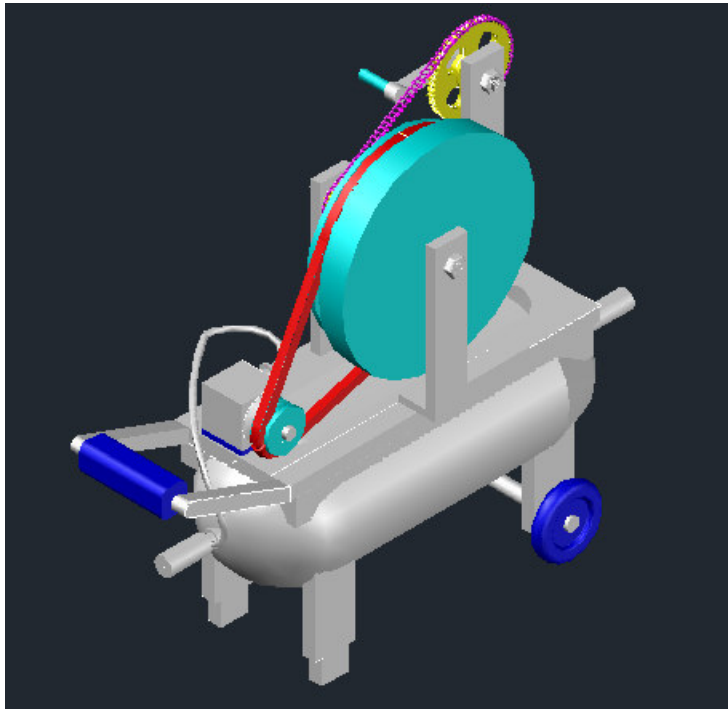


Fig 3: Isometric View of Manual Compressor North East

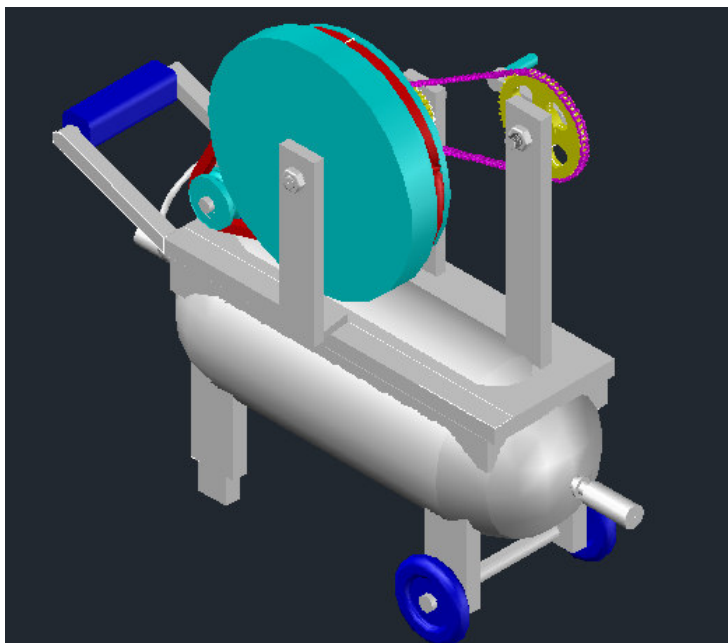


Fig 3: Isometric View of Manual Compressor North West

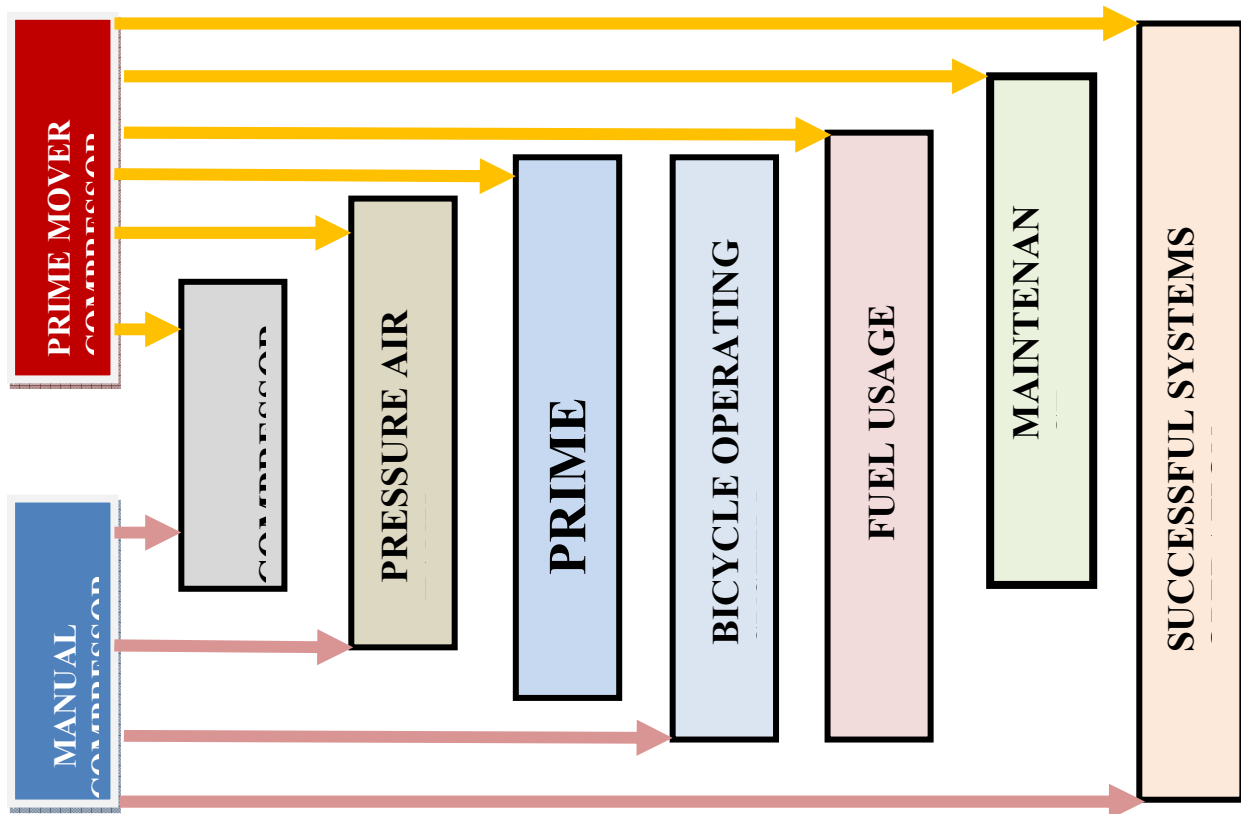
The Picture of the Prototype manual airbrush compressor



Testing of the developed prototype manual airbrush compressor, the purpose of the exercise was to improvise a working manual airbrush compressor for students use

The manual airbrush compressor tested and found to be very effective, all the accessories were effective and the exercise considered successful

Materials Used Comparative diagram for the Automated Air Compressor and Manual Operated Air Compressor



Analysis of the materials used for both the automated and the manual air compressor

From the diagramme 1 above, the components and materials used for the automated air compressor are higher in cost. Also, the daily usage of fuel, monthly maintenance influences high cost.

In the case of the manual air compressor as shown on the diagramme, only two components were found common between the manual and the automated air compressors i.e. compressor & air tank. The bicycle system in the case of the manual replaces the prime mover which cost is about 4% the total cost of the prime mover.

Advantages of the manual air compressor

- (1) The manual air compressor cost less with very low maintenance.
- (2) Cost of the prime mover is cut off.
- (3) The cost of monthly maintenance cut off.
- (4) Non usage of fuel made it environmental friendly i.e. no air pollution or fire hazard.
- (5) The user of the manual compressor can enjoy mild exercise.
- (6) The bicycle system adopted has very low cost implication.
- (7) There is no noise like the prime mover.

Summary of Findings

The findings reveal a success, this implies that the developed manual airbrush compressor can help to improve the performance of student artists. The outcome therefore is that, beside using the manual airbrush compressor to facilitate the teaching of art and design, there is also a clear indication that it can be used to make students improve in their capacity to independent learning, which can cultivate the attitude of self development. This finding confirms what the National Educational Technology Centre Kaduna has been advocating for. Also if teachers could learn how to improvise and develop technologies of improvisation such as this manual compressor model. This developed resource could be further studied and updated for use by institutions where art and design is learned.

Recommendation

Based on the findings the followings recommendations are made:

Experts can come up with improved designs to enhance its performance that could meet the need of other users of air compressors like ,Tire menders ,Car painters,Welders etc.

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